I have tried the plan of putting a few grains of chloral into the vessel whenever emptied and replaced. From that moment, the room and even the bed, bedding, and vessel were absolutely freed from all odour whatsoever. It would prove also, I think, a very valuable agent for injection into the bladder in cases of retention or inflammation, etc., in which there is any decomposition of the urine.

I have tried it as a disinfectant in cases of offensive ulcers, abscesses, cancer of the womb, caries, ozæna, etc., and I like it better than any other I have tried. It has the advantage over carbolic acid of having very little smell, and over the permanganate that it does not stain the bedding, clothing, etc. As a dressing to ulcers, it acts as a stimulant to the granulations, destroys fetor, diminishes the discharge and makes it healthy, and so will often change an unhealthy into a healthy sore. For both these purposes I use it generally about gr. v–xv ad f℥j.

In erysipelas I have tried it twice as a dressing, and it succeeded well. As an injection into sinuses in strumous abscess, in caries, and other similar cases, the Drs. Dickson write of it in high terms, and I can confirm their observations from my own experience, after numerous trials. They also have tried it as an ointment (ʒss ad f℥j) with success, and as an injection in gonorrhœa (gr. xx ad f℥j) when the discharge has generally ceased after three days or thereabouts.

In conclusion, I desire to guard against the impression that I wish to exaggerate the advantages of chloral. I have stated facts rather than inferences. Where it has failed I have candidly stated it. Where it has been but partially successful, I have not concealed it. I believe that in anatomy it surpasses every other preservative I have tried; in preserving pathological specimens, it is also the best means in use; and in surgery it adds another remedy of great value in the external treatment of many cases of disease.

ART. VI.—*Resection of Metatarsus, Anterior Tarsus, and parts of Astragalus and Os Calcis. Recovery, with useful Foot.* By P. S. CONNER, M.D., Professor of Anatomy and Clinical Surgery in the Medical College of Ohio, Surgeon to Cincinnati and Good Samaritan Hospitals. (With a wood-cut.)

P. S., German, labourer, æt. 33, admitted March 9, 1874. Seventeen days ago, while cutting ice, received an axe-stroke on dorsum of left foot, just above tarso-metatarsal articulation, severing tendons, dorsal artery, and accompanying nerve. On the fifth day symptoms of acute periostitis manifested themselves. Upon admission the foot was very much swollen, pus was freely discharging from opening previously made, and examination with probe revealed denuded bone.[1]

When the case came under my care (May 13, about eight weeks after the receipt of the injury) there were four openings upon the dorsum, pus in considerable quantity was being discharged, and there was evidently extensive disease of the tarsus. The man's general condition was bad, appetite poor, pulse 120. No record of temperature.

Either amputation or resection was a necessity. As the disease was apparently confined to the anterior tarsus, it was determined to remove the bones, and make an effort to save the foot.

On the 18th of May, the general condition of the patient being somewhat improved, the operation was made in the presence of several medical friends and the students in attendance upon the clinical course. The patient having been anæsthetized, and the Esmarch bandage applied, a curved incision was made, commencing just above the base of the second metatarsal bone, carried across the dorsum through the cicatrix of the original wound, and terminating on the outer border of the foot, somewhat posterior to the calcaneo-cuboid articulation.

The flap thus marked out having been dissected back, the bones of the anterior tarsus were removed, a portion of them being so softened as to be readily scooped out with the thumbs.

Upon the removal of these bones (*scaphoid*, *cuboid*, and *cuneiforms*) the anterior portion of the astragalus and os calcis was found diseased, and with the bone-forceps and osteotribe there were removed, perhaps, *one-fourth of the astragalus*, and *one-third of the os calcis.*

Examination of the metatarsal bones now showed that their bases were diseased, and the periosteum separated to nearly their phalangeal extremities. An incision was made from the primary cut forwards over the second metatarsal bone, and the *entire metatarsus* taken away, there being then left of the skeleton of the foot only the phalanges, three-fourths (perhaps four-fifths) of the astragalus, and about two-thirds of the os calcis.

Upon the removal of the Esmarch tubing considerable oozing of blood occurred, but no hemorrhage of any importance. Charpie, saturated with a weak solution of carbolic acid (℥j–Oj) was packed into the cavity, a bandage of mosquito-netting applied, and the foot placed in a fracture-box, and surrounded with bran.

The after constitutional disturbances were of no great severity. At no time after the second day was the pulse above 120, or the temperature higher than 102$\frac{1}{5}$° F., and but twice after the fifth day was the pulse above 100, or the temperature above 101$\frac{2}{5}$° F. (These observations were made and recorded twice a day.) The progress of the case towards recovery, though not very rapid, was uninterrupted, and when I went off duty (August 1) the wound was almost entirely cicatrized.

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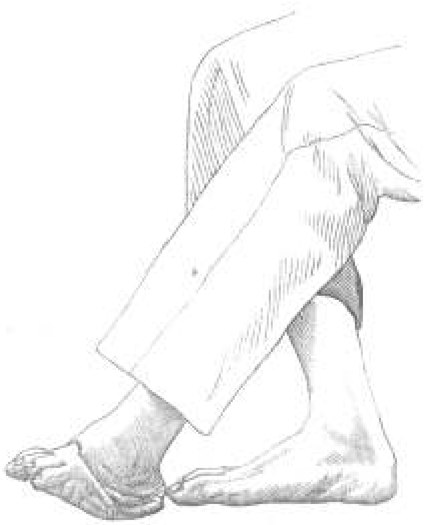
[1] Abstract of report of case, Records of Cincinnati Hospital, 1874.



The patient remained in hospital until the 9th of October, when he was discharged "cured," being able to walk tolerably well with the aid of a cane, and having some motion at the ankle-joint.

On the 3d inst., ten and a half months after the operation, when the photograph was taken from which the accompanying wood-cut was made, the man could walk very readily without a cane, and could rest his entire weight upon the foot, and then raise the heel slightly from the ground. The motion of the ankle-joint was about one-half that of the corresponding joint of the opposite side (18°–35°). The foot is, of course, much shortened, but affords an excellent base of support; and as all the points of the "tripod" are preserved, and the ankle-joint is in good working order, the ordinary movements in walking are well performed.

An idea of size and shape may be formed from the following comparative measurements:—

	Left foot.	Right foot.
Across base of toes, plantar surface . . .	3⅜ inches	3½ inches.
Across heel, plantar surface	2⅝ "	2½ "
Extreme length	6½ "	10⅛ "
From external malleolus to end of little toe .	3 "	6⅞ "
From internal malleolus to end of great toe .	4¼ "	8 "

Extensive disease of the tarsus is generally considered to demand either the middle-tarsal or tibio-tarsal amputation rather than resection. Even many surgeons, who, with Mr. Teale, advocate excision when the disease is in the posterior tarsus, agree with him in making the Chopart amputation when it is the anterior part of the foot that is affected. It is considered that either the disease cannot be completely removed—in other words, that it will afterwards extend to bones apparently healthy at the time of the resection—or that the foot left will be not only useless, but a positive incumbrance.

But experience has, we believe, clearly shown that complete removal of a diseased bone or bones of the tarsus, has time and again brought about a perfect cure, and this too in cases of caries as well as of traumatic osteitis.

In many of the recorded cases in which a second or third operation has been made, the trouble (we may fairly conclude) was not so much in the disease itself as in the want of thoroughness in the primary resection, or in the leaving of a portion of a bone which had been subjected to the rough action of the bone-forceps or gouge.

That the second objection to extensive resections (the uselessness of the preserved foot) is not a valid one, we may consider as well established by the reports of cases which we will hereafter mention. My own case has convinced me that an operation such as was made, when successful, leaves the patient in decidedly better condition than an amputation, and, if unsuccessful, the foot can afterwards be removed.

As respects the method of operating, a dorsal flap may be turned up, as in the case I have reported, or by incisions made on the inner and outer borders of the foot, access to the bones may be secured. The latter is the method adopted by Watson, of Edinburgh ; and Jaesche says that he would have employed it if he had known beforehand how much bone he would have to remove.

It has the advantage of saving the important structures of the dorsum, tendons, vessels, and nerves, but in a case in which I used it (a case resulting fatally from pyæmia on the 12th day), I found the removal of the bones much more difficult than when they were fully exposed by the curved incision across the dorsum.

In one of the earlier operations (Dunn's), the hemorrhage was profuse, but in no other case, so far as I have discovered, has it given rise to any special trouble. (In Liston's case in 1818 there was secondary hemorrhage from the anterior tibial which necessitated ligation of that vessel.)

By the use of the Esmarch bandage, bleeding during the removal of the bones may be prevented, and the extent of the disease quite satisfactorily determined.

The after-hemorrhage, which may be expected to be more abundant than if the "bloodless method" had not been employed, can, if necessary, be controlled by thorough stuffing of the cavity and the application of a bandage. In all cases care must be taken to prevent too early union of the edges of the incision, and consequent bagging of pus.

Watson declares that in the case in which he made a secondary amputation he was " chagrined to find that there was no condition which should not have admitted of sound cicatrization had the method of dressing the cavity of the wound been rigidly carried out."

It is very probable that proper attention to this matter of dressing would have secured a more favourable result in Jaesche's case, for, though the principal wound was almost healed, there was found post-mortem "a considerable quantity of pus in the deep part of the wound."

Respecting the condition of the parts some time after resection, but little can be said. "Complete recovery with useful foot" has been reported, but there have been as yet but few opportunities afforded for post-mortem examination. Holmes presented to the Pathological Society, May 15th, 1860, a specimen in which the gap left by the removal of the cuboid and external cuneiform was filled up by fibrous tissue which he believed would ultimately, had the individual lived, have undergone ossification; and Watson exhibited at the meeting of the Med.-Chir. Society of Edinburgh, July 15th, 1874, a foot in which "a fibro-osseous structure occupied the hiatus resulting from removal of the anterior tarsus."

The relative mortality of the two operations, amputation and resection, cannot as yet be determined with much accuracy.

It would appear from Hancock's statistics that the Chopart amputation may be expected to result fatally in about 3 per cent. of the cases in which it is made for disease, and in about 23 per cent. of those for accident (excluding gunshot?); and the ankle-joint amputations (Syme's and Pirogoff's) in about 6 per cent. of those for disease, and about 11 per cent. of those for accident.

Examination of the appended table shows that in the resections of the entire anterior tarsus the mortality was 20 per cent. (in two-thirds of these fatal cases the result is not fairly attributable to the operation), and in those of a considerable portion of the anterior tarsus 16.67 per cent. The cases reported, however, are too few to make statistics based upon them of much value.

It is not, of course, every case of disease of the tarsus that will admit of resection. The extent of the osseous lesion, the condition of the soft parts, the probable inability of the patient to survive the necessary confinement and considerable suppuration, one or all may decide the question in favour of amputation; but the decision should not be so made simply because there is a diseased condition of even the entire anterior tarsus.

As indicating how far conservatism can be carried in the surgery of this part of the foot, I present a tabulated statement of all the extensive resections (*i. e.* of not less than two bones), that I have been able to find recorded, not including, however, cases involving the ankle-joint unless a part at least of the anterior tarsus was taken away, nor those in which by cauterization and the use of the gouge, operators have so followed up progressive disease as ultimately to leave but little of the original skeleton of the foot. It will be seen that in the case I have reported a greater part of the foot was taken away than in any other included in the table. D'Armbruste's operation is omitted ("removal of *twenty-seven* (!) bones of greater or less size from the middle and outer portion of the tarsus, there remaining only those which were connected with the great toe"); either only necrosed pieces of bone were taken away, or the anatomy of the foot was as extraordinary as the result of the resection was marvellous.

No.	Operator.	Bones removed.	Result.	Authority.	Remarks
1	Hasse	Anterior tarsus	Recovery	Archives Générales, ser. 5, t. 4	Caries of 22 years' duration.
2	Dunn	Anterior tarsus, bases of 2d and 3d metatarsals and very small part of astragalus	Recovery. Ultimately 1½ inch shortening	Med. Chir. Trans., 11, 337	Bones removed at two operations.
3	Champion	Anterior tarsus, bases of 3d, 4th, and 5th metatarsals	Caries reappeared in other bones before cicatrization took place	Blackman's Mott's Velpeau, II. 483	
4	Moreau, Jr.	"Similar case"	"Similar case"	" "	
5	Bigelow, H. J.	Anterior tarsus, bases of 2d and 3d metatarsals	Death 5½ months later	Hodges's Exc. of Joints	
6	Laugier	Anterior tarsus, bases of 2d, 3d, and 4th metatarsals	Death a month later from phthisis	Archives Générales, ser. 5, t. 4	"Examination of the uncicatrized foot showed that the ultimate result would doubtless have been satisfactory."
7	Bryant	Anterior tarsus	Recovery. "Excellent foot"	"Surgery," p. 764	Boy aged 8.
8	Watson, P. H.	Anterior tarsus, bases of metatarsals	Recovery	Edin. Med. Journ. May, 1874.	
9	Watson, P. H.	" " "	"	" "	
10	Watson, P. H.	" " "	"	" "	
11	Watson, P. H.	" " "	"	" "	
12	Watson, P. H.	" " "	"	" "	
13	Watson, P. H.	" " "	Failure, subsequent amputation	" "	
14	Conner	Anterior tarsus, metatarsus, one-fifth of astragalus, one-third of os calcis	Recovery		Following injury.
15	Conner	Anterior tarsus, metatarsus (except part of 1st metatarsal)	Death from pyæmia on 12th day after 2d operat'n		Following injury.
16	Moreau, Sr.	Cuboid, 3d cuneiform, base of 4th metatarsal, adjoining surface of 5th metatarsal, and articular surface of os calcis with cuboid	Perfect cure	Moreau, Resection des os, p. 110	
17	Bryant	Cuboid and three cuneiforms	Recovery. "Excellent foot"	"Surgery," p. 958	
18	Kade	Cuboid, 2d and 3d cuneiforms, 4th and 5th metatarsals	Recovery	St. Petersburgh Med. Zeit. 1864 Schmidt's Jahrbücher, 155 (1872), p. 212	Gunshot injury.
19	Kade	Scaphoid, 1st and 2d cuneiforms, greater part of 1st metatarsal	Death from pyæmia in 7th week	" "	Necrosis following contusion.
20	Jagaker	Scaphoid, two cuneiforms, head of astragalus	Recovery. "Sound and useful limb"	Med. Times and Gaz., Oct. 30, 1869	
21	Owens	Cuboid, middle and external cuneiforms	Recovery	Culbertson's tables	
22	Teale	Posterior tarsus and cuboid	"	Hancock Anat. & Surg., Foot, p. 84	
23	Teale	" " cuboid and scaphoid	"	Hancock Anat. & Surg., Foot, p 86	
24	Mulvany.	Ankle joint, posterior tarsus and three-quarters of scaphoid	Complete recovery	London Lancet, Nov. 6, 1869	
25	Lehman	Posterior tarsus and scaphoid	Complete recovery	Deutsche Klinik, 1870	
26	Fayrer	Posterior tarsus and scaphoid	"In fair way to recover"	Med. Times and Gaz., July 31, 1869	
27	Liston (1818)	Ankle-joint, astragalus, scaphoid, and two cuneiforms	"Complete and lasting cure, without much deformity or lameness"	Edin. Med. Journ., Jan. 1821	

No.	Operator.	Bones removed.	Result.	Authority.	Remarks.
28	Liston (1832)	Scaphoid, two cuneiforms, and upper surface of astragalus	"Did not succeed"	Blackman's Mott's Velpeau, II. 483	
29	Skey	Necrosed portions of tarsus and parts of scaphoid and cuneiform	Recovery	London Lancet, Dec. 4, 1858	
30	Bradford	Small part of astragalus, os calcis, and cuboid	Excellent recovery	Gross' Syst Surg., II. 1094	
31	Humphrey	Ankle-joint, astragalus, and scapboid	Failure	London Lancet, Aug. 6, 1864	Subsequent amputation.
32	Holmes	Astragalus and scaphoid	Recovery	London Lancet, May 27, 1865	
33	Langenbeck	Ankle-joint, astragalus, cuboid, part of os calcis	"	Jahresbericht für gesam medicin, 1872, 2, 436 N. Y. Med. Rec. June 1, 1872	Gunshot injury.
34	Forster	Scaphoid, internal cuneiform, part of metatarsal	"	Guy's Hosp. Rep. Ser. 3, XVII., 387	
35	Jaesche	All the tarsus except small portions of posterior surface of os calcis, base of 2d metatarsal	Death from pyæmia in 3d week	Langenbeck's Archives, 8 173 Bien, Retr. (Sydenham), 1867–8	

Resections of entire anterior tarsus		15
successful	9	
unsuccessful	3	
fatal	3	
Resections of part of anterior tarsus		6
successful	5	
fatal	1	
Resections of entire posterior and part of anterior tarsus . . .		5
successful	5	
Resections of part of posterior tarsus and anterior tarsus . . .		8
successful	6	
unsuccessful	2	
Resections of entire tarsus		1
fatal	1	
Total		35

Whole number successful	25 (71.4 per ct.)
" " unsuccessful	5 (14.3 per ct.)
" " fatal	5 (14.3 per ct.)

271 RACE STREET, CINCINNATI, April, 1875.

ART. VII.—*Anomalies in Cardiac Pathology.* By EDGAR HOLDEN, M.D., PhD., Newark, N. J., March, 1875. Read before the New Jersey Academy of Medicine.

THE discovery of the inhibitory or reflex function of nervous vitality has probably been the starting-point of more practical knowledge, and more varied research in cardiac pathology, than any since the memorable inves-